510(k) Summary

AS REQUIRED BY 21 CFR 807.92(c)

510(k) number: k131931

JUL 26 2013

A. Submitter's Name:

Chemtron Biotech, Inc.
Address: 8370 Juniper Creek Lane, San Diego, California, 92126
Telephone number: (858) 530-2868
Contact person: Jane Zhang
Prepared on July 25, 2013

B. Name of the device (Trade/Proprietary Name):

Chemtrue® hCG Pregnancy Urine Midstream Test
Classification: Class II.

C. Predicate Kit:

Predicate device name(s) and 510(k) number(s):

Predicate Device Name	510(k) k number
OSOM® Card II hCG-Urine Test	K990578

D. Indications for Use:

The Chemtrue® hCG Pregnancy Urine Midstream Test is a rapid lateral flow qualitative immunoassay for early detection of human chorionic gonadotropin (hCG) in human urine in the device format of Midstream. The test is designed to aid early detection of pregnancy by home users. The device is intended for Over-The-Counter (OTC) Use.

E. Substantial Equivalence Information:

The Chemtrue® hCG Pregnancy urine Midstream Test is substantially equivalent to other tests currently on the market.

In comparison with the predicate, the Chemtrue® hCG Pregnancy Urine Midstream Test is similar to the predicate(s) with regard to the technology principle, test method, detection limit, sample matrix and performance, etc. The candidate device and the predicates are both visually-read single use devices. Comparison with the predicate devices is outlined below:

Item	SIMILARITIES AND DIFFERENCES	
	Proposed Device Chemtrue® hCG Pregnancy Urine Midstream Test	**Predicate Device** OSOM® Card II hCG-Urine Test K990578
Intended Use	A rapid qualitative immunoassay for rapid determination of human chorionic gonadotropin (hCG) to aid in the early	Same

	detection of pregnancy	
Technology principle	Colloidal gold conjugate lateral-flow immunoassay	Same
Specimen matrix	Human urine	Same
Result Interpretation	Visually-read line intensity	Same
Sensitivity	20 mIU/mL	Same
Quality Control	Built-in Internal Control	Same
Read time	Read the results at 3 minutes.	Same
Indication of Use	For Over-The-Counter (OTC) use	For prescription use
Device format	Midstream	Cassette
Storage	4°C – 30°C	15°C – 30°C
Traceability	WHO International Standard 5th Edition	WHO International Standard 3rd Edition

CONCLUSION: All the nonclinical and clinical study data in this 510(k) summary demonstrates that the Chemtrue® hCG Pregnancy Urine Midstream Test is substantially equivalent to the legally marketed devices.

F. Device Description:

Test principal: The device employs lateral flow immunoassay technology for detection of human chorionic gonadotropin (hCG) in urine. Monoclonal goat anti-hCG antibodies are pre-striped in the nitrocellulose membrane on the test region (T line) and goat anti-mouse antibodies on the control region (C line). During testing, the urine/serum specimen reacts with the conjugate pad (It contains colloidal gold particles conjugated with monoclonal anti-hCG antibody specific to the beta subunit of hCG) located just beneath the sample pad and above the membrane of the test strip. The specimen migrates upward on the membrane by capillary action to react with the antibodies on the membrane. If the hCG concentration in the specimen is at or above the designated detection limit, a red colored line at the test region will be present indicating a positive result, while its absence indicates a negative result. The control line (C line) serves as an internal quality control. The control line should always appear, regardless of the hCG concentration of the test specimen, and the C line is an indicator that sufficient sample volume has been added to the test device and the sample has correctly migrated up the test strip.

The device is designed in Midstream format. Each device consists of one (1) individual test strip and each test strip in the device consists of:

1) A conjugate pad contains colloidal gold conjugated with monoclonal anti-hCG antibody specific to the beta subunit of hCG.
2) A nitrocellulose membrane which is striped with the specific goat anti-hCG in the test line (T line) and goat anti-mouse antibody in the control line (C line). Presence of this line indicates that the test is performed correctly. A test result is read at three (3) minutes and the cut-off of the device is 20 mIU/mL hCG.

The Midstream Test kit consists of one test device in a foil pouch and a package insert.

Regulatory Information:

Product Code	Classification	Regulation Section	Panel
LCX	Class II	21 CFR 862.1155, Human Chorionic Gonadotropin (hCG) test system	75 Clinical Chemistry (CH)

Performance Characteristics:

Chemtron Biotech, Inc. has reviewed the FDA guidance documents "Review Criteria for Assessment of Professional Use Human Chorionic Gonadotropin (hCG) *In Vitro* Diagnostic Devices (IVDs) – Document Issued on: November 6, 1996", "Guidance for Over-The-Counter (OTC) Human Chorionic Gonadotropin (hCG) 510(k)s issued on July 22, 2000, as well as CFR809.10 labeling regulations and the applicable studies listed in the notification were conducted, including the design of draft labeling and package inserts. The result read time for all the studies was three (3) minutes.

1. **Sensitivity (Cutoff Characteristics):** Three (3) lots were used for the study with spiked hCG urine pool from non-pregnant donors. The hCG was traceable to WHO 5th IS (07/364) at the concentrations of 0, 10,15,20,40 and 80 mIU/mL. The controls were blind coded. Separate sets of the blind codes were assigned. Five (5) replicates were tested at each hCG control level by three (3) operators using simulated midstream test method. The results are summarized in table 1 below:

Table 1. Chemtrue® hCG Pregnancy Urine Midstream Test:

hCG Conc. (mIU/mL)	# of Tests	Lot 1		Lot 2		Lot 3		# of Positives
		+	-	+	-	+	-	
0	15	0	5	0	5	0	5	**0/15**
10 (-50% Cutoff)	15	0	5	0	5	0	5	**0/15**
15 (-25% Cutoff)	15	1	4	1	4	1	4	**3/15**
20 (Cutoff)	15	5	0	5	0	5	0	**15/15**
40 (+200% Cutoff)	15	5	0	5	0	5	0	**15/15**
80 (+400% Cutoff)	15	5	0	5	0	5	0	**15/15**

CONCLUSION: The results confirmed the claimed cutoff (sensitivity) levels for the Chemtrue® hCG Pregnancy Urine Midstream Test of 20 mIU/mL. Also the results demonstrated that the consistency between lots.

2. **Reproducibility (Precision) Study:**

a. Precision/Reproducibility: The study was conducted in three (3) POL sites by a total of nine (9) operators and three (3) operators for each site with three (3) lots over five (5) non-consecutive days. The blind coded controls were used with hCG spiked at the concentrations of 0, 10, 15, 20, 25, 30, 35, and 40 mIU/mL in urine. The controls were calibrated against WHO 5th IS (07/364). Every device was tested by using simulated midstream method and interpreted by the same operator each day. The reproducibility among the sites is summarized in Table 2 below:

Table 2. Reproducibility among three (3) clinical sites

		Sites						TOTAL	
		1		2		3			
	Spec.	+	-	+	-	+	-	+	-
hCG concentration (mIU/mL)	**0**	0	9	0	9	0	9	0	27
	10 (-50%cutoff)	0	9	0	9	0	9	0	27
	15 (-25%cutoff)	1	8	1	8	1	8	3	24
	20 (Cut-off)	9	0	9	0	9	0	27	0
	25 (+25%cutoff)	9	0	9	0	9	0	27	0
	30 (+50%cutoff)	9	0	9	0	9	0	27	0
	35 (+75%cutoff)	9	0	9	0	9	0	27	0

CONCLUSION: The results demonstrate a consistent functional performance of the Chemtrue® hCG Pregnancy Urine Midstream Test between the sites.

b. Linearity/assay reportable range:
Linearity is not applicable since this is a qualitative test.

c. Traceability, Stability, Expected values (controls, calibrators, or methods):
Chemtrue® hCG Pregnancy Urine Midstream Test is calibrated against reference material traceable to WHO International Standard 5th edition.
A shelf-life stability test of the devices was performed in real-time and accelerated temperatures at 40°C and 60°C, respectively. The results support that the devices were stable for 24 months when stored at 25±2°C in the sealed foil pouch.

d. Detection limit:
Refer to the cutoff characteristics/sensitivity and precision data. The detection limit was demonstrated to be 20 mIU/mL.

e. Analytical specificity:
The cross-reactivity study was carried out with three (3) lots of Chemtrue® hCG Pregnancy Urine Midstream Test by adding known amount of structurally-related potential cross reactants of human luteinizing hormone (hLH), human follicle stimulating hormone (hFSH) and human thyroid stimulating hormone (hTSH) to the hCG negative (5mIU/mL) and positive (50 mIU/mL) samples in urine, respectively. The results demonstrate that there is no interference at 1000 IU/L FSH, 500IU/L LH, or 1000 IU/L TSH for both negative and positive urine samples.
To evaluate the potential for interference with certain exogenous compounds, each compound was prepared by diluting stock interferent material to the desired concentration. Pooled urine samples containing 0 and 20 mIU/mL hCG were spiked with the interferents to obtain the desired test concentration. The samples were tested using simulated midstream method with three (3) different lots of Chemtrue® hCG Pregnancy Urine Midstream Test. No interference was observed from exogenous compounds at the following concentrations for both negative and positive hCG urine samples:

Table 3.

Substance	Concentration
Acetylsalicylate Acid	20 mg/dL
Albumin (Human)	2000 mg/dL
Ascorbic Acid	20 mg/dL
Atropine	20 mg/dL
Bilirubin	2 mg/dL
Caffeine	20 mg/dL
Cannabinol	10 mg/dL
Ephedrine	20 mg/dL
Gentisic Acid	20 mg/dL
Glucose	2000 mg/dL
Hemoglobin	250 mg/dL
Ibuprofen	40 mg/dL
Methadone	10 mg/dL
Morphine	6 µg/dL
Phenylpropanolamine	20 mg/dL
Salicylic acid	20 mg/dL
Uric Acid	20 mg/dL

To ensure that the Chemtrue® hCG Pregnancy Urine Midstream Test does not interfere with β-core hCG fragment, five (5) replicates from three lots were tested with the spiked β-core hCG fragment (Source: WHO reference reagent 99/708) at the concentration of 125,000, 250,000, 500,000 and 1,000,000 pmol/mL in to 5 and 50 mIU/mL hCG of the urine controls, respectively. The results demonstrate that β-core hCG fragment up to 1,000,000 pmol/mL does not interfere with Chemtrue® hCG Pregnancy Midstream Test.
The pH effect was evaluated by testing spiked hCG concentrations of 0 and 20 mIU/mL at pH 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0 and 9.0. Duplicate tests were performed at each level for each test format. The results indicate that over the pH range from 2.0 to 9.0, no interference was observed with the Chemtrue® hCG Pregnancy Urine Midstream Test.

The specific gravity (SG) effect was evaluated by testing the diluted urine at the SG of 1.003, 1.005, 1.010, 1.020 and 1.030 with spiked hCG concentrations at 0 and 20 mIU/mL, respectively. Duplicated tests were performed at each level. The results demonstrate that no interference was observed with the Chemtrue® hCG test over the SG range from 1.003 to 1.030.

High dose /hook effect was evaluated on three (3) lots with spiked non-pregnant urine pool at hCG concentrations of 50, 100, 200, 300 and 500 IU/mL. Five (5) replicates were tested each lot at each hCG concentration using simulated midstream test method. The results demonstrate that no hook effect was observed with the hCG concentrations up to 500 IU/mL in urine.

f. Assay Cutoff:

The cut-off for a positive test for Chemtrue® hCG Pregnancy Urine Midstream Test is 20 mIU/mL.

3. **Method Comparison Study Data Summary:** Urine samples were collected from 100 women per hospital presenting at three (3) hospitals to test for pregnancy. Approximately half of the women who were suspected to be pregnant. Fifty-five (55) participants were either in the early first trimester of pregnancy or later in the first trimester. Samples were randomly collected at various times throughout the day. Age range was from 22 to 39 years. All subjects performed self-test and collected samples for tests by healthcare professionals (HCPs) with the proposed Chemtrue® hCG Pregnancy Urine Midstream Test and the predicate device. Each specimen was evenly split into three aliquots with a unique set of blind codes. The results are summarized in tables below:

Table 4. Comparison Chemtrue® hCG Midstream Test with predicate device by professionals

		Predicate Device - OSOM® Card hCG-Urine Test		**Total Agreement %**
		Positive	**Negative**	
Chemtrue® hCG Midstream Tested by Professionals N=300	**Positive**	150	0	100%
	Negative	0	150	
	Total	150	150	

CONCLUSION: The agreement of Chemtrue® hCG Pregnancy Urine Midstream Test with the predicate device is 100%.

4. **OTC lay-user Study:** To confirm the cut-off with the intended use population and evaluate the suitability of the Chemtrue® hCG Pregancy Urine Midstream Test to be used by the home use consumers (lay persons), natural and spiked urine samples were tested by the lay persons and the results were compared with the HCPs' results.

   Negative urine sample pools were spiked with 10, 15 and 25 mIU/mL hCG to create samples with concentrations near the cut-off concentration (20 mIU/mL). Each concentration sample pool was split into 100 individual vials. All aliquots were blindly labeled by the Clinical Research Coordinator.

   One hundred (100) women with diversified education backgrounds and ages ranging from 22-39 years participated in the lay user study. The study was performed at three (3) clinical sites. These 100 female participants suspecting pregnancy tested their own urine and one masked sample using midstream method per the English package insert as guide to perform the test. Aliquots of the participants' urine and spiked urine were tested by HCPs using dip method. The results are summarized results in Tables 5 and 6 below:

Table 5. Compare the OTC Lay-user testing using Midstream method with HCPs in Dip method

		Dip Method by HCPs		**Total Agreement %**
		Positive	**Negative**	
Midstream Method by OTC lay-user N=100	**Positive**	55	0	100%
	Negative	0	45	
	Total	55	45	

Table 6. Cut-off testing results by lay-users using simulated midstream method *vs* HCPs using dip method

Masked spiked hCG Concentrations	**Number of positive results to the total number of tested samples**	
	Tested by Lay-users using simulated midstream method	Tested by HCPs using dip method
10 mIU/mL (-50% of the cutoff)	0/33	0/33
15 mIU/mL (-25% of the cutoff)	2/34	1/34
25 mIU/mL (+25% of the cutoff)	33/33	33/33

DISCUSSION: The results further confirm the cut-off of the Chemtrue® hCG Pregnancy Urine Midstream Test. The results demonstrate the equivalency of the Midstream testing method and dip method and the suitability of the Chemtrue® hCG Pregnancy Urine Midstream Test to be used by the home use consumers (lay persons), in comparison with healthcare professionals (HCPs). The results also demonstrate the 100% agreement between OTC lay-users and healthcare professionals.

Each patient was given an English questionnaire to assess the readability of the labeling. A Flesch-Kincaid reading analysis was performed on all package inserts and the score revealed a reading Flesch-Kincaid Grade Level 7. The results of the questionnaire reflected that the consumers found the test easy to use and that they did not have difficulty to understanding the labeling and interpreting the results.

G. Standard/Guidance Document Referenced (if applicable):

- Guidance for industry and FDA reviewers/staff: Guidance for over-the-counter (OTC) Human chorionic gonadotropin (hCG) 510(k)s. Documents issued on: July 22, 2000.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

July 26, 2013

Chemtron Biotech, Inc.
C/O Jane Zhang
8370 Juniper Creek Lane
SAN DIEGO CA 92126

Re: K131931
Trade/Device Name: Chemtrue hCG Pregnancy Urine Midstream Test
Regulation Number: 21 CFR 862.1155
Regulation Name: Human chorionic gonadotropin (HCG) test system
Regulatory Class: II
Product Code: LCX
Dated: June 26, 2013
Received: June 27, 2013

Dear Ms. Zhang:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please go to http://www.fda.gov/AboutFDA/CentersOffices/CDRH/CDRHOffices/ucm115809.htm for

the Center for Devices and Radiological Health's (CDRH's) Office of Compliance. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Courtney H. Lias, Ph.D.

Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known): k131931

Device Name: Chemtrue® hCG Pregnancy Urine Midstream Test

Indications For Use:

The Chemtrue® hCG Pregnancy Urine Midstream Urine Test is a rapid lateral flow qualitative immunoassay for early detection of human chorionic gonadotropin (hCG) in human urine in midstream format. The test is designed to aid early detection of pregnancy by home users. The device is intended for Over-The-Counter (OTC) Use.

Prescription Use_____ And / Or Over the Counter Use__X__

(PLEASE DO NOT WRITE BELOW THIS LINE; CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostics and Radiological Health (OIR)

Denise Johnson-lyles -S
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Division Sign-Off
Office of In Vitro Diagnostics and Radiological Health

510(k) k131931